THE JOURNAL OF
EDUCATIONAL PSYCHOLOGY

Volume 39 April, 1948 Number 4

GROUP THERAPY WITH PHYSICALLY HANDICAPPED CHILDREN. I: REPORT OF STUDY

WILLIAM M. CRUICKSHANK AND EMORY L. COWEN

School of Education
Syracuse University

INTRODUCTION

Studies[8,2] are reported in which group play therapeutic techniques, essentially non-directive in nature, are utilized following the principles established by Rogers[12] and Axline.[2] Generally these techniques have been used with children who, while presenting emotional problems, are nevertheless physically normal, and mentally are within normal to superior intelligence levels. Axline, however, notes that the handicapped child "benefits by a therapeutic experience if the handicap is a source of conflict and anxiety and emotional disturbance." She reports cases wherein non-directive therapeutic techniques were employed with handicapped children. She also reports the progress made by one child who had a serious visual impairment and who had benefited from a group therapy experience as one child among several physically normal children. The present writers are unaware of any other research studies to supplement Axline's reports of therapy in which a non-directive approach through group play has been applied to physically handicapped children, although Rubenstein[13] has used a 'therapeutic' approach with groups of orthopedically handicapped adolescents.

For some time, as study after study has reported the greater presence of emotional needs and personality maladjustments among the physically handicapped as compared with groups of physically normal individuals,[15,9] the need for the development of counseling and therapy methods for the handicapped has been

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recognized. Barker[4] has pointed out the somatopsychological significance of the relationship between physical abnormality and personality growth and development and has stressed the importance of a normal physique in considering the dynamics of good personal adjustment. Although basic differences in philosophy are apparent, Levy,[10] Allen and Pearson,[1] Bender,[5] Schilder,[14] and others have each emphasized the susceptibility of physically atypical individuals to emotional disorders as a sole or partial result of the impact of the imperfect physique upon the individual's potential for adjustment. Preliminary results of a study of the emotional needs of crippled children[7] indicate that there is an increasing feeling of guilt in such children between the years corresponding to the fourth and twelfth grades; that this situation is accompanied by a general trend of increasing fears; and that neither trends are offset by an expressed feeling of acceptance and of security which the crippled child experiences in the home and school. It is apparent that the usual counseling and guidance services available to handicapped children in school are not sufficient to insure adequate personal adjustment. It is also evident that the need is a general characteristic of the group, not specific to particular individuals, and that, therefore, handicapped children must be insured adequate opportunities for emotional release and therapy.

In order to determine whether or not non-directive group therapy techniques were applicable to physically handicapped children a therapy situation, purely experimental and exploratory in nature, was projected. It was hoped that through such an approach it would be possible to develop therapy techniques suitable to the handicapped or to determine what modifications if any to the principles of non-directive group play as established by Axline would be necessary to make the technique applicable to special needs of the handicapped.

METHOD

The study took place in a public day school for physically handicapped children. Five children, all of whom were referred by the school authorities because they presented one or more emotional problems in the school situation, were included in the group. Originally it was planned that the group would include six children, but since one of the children was absent for

the first five meetings he was excluded from the group and no replacement was made. The final group consisted of four boys and one girl as shown in Table I. Two children were handicapped by cardiac conditions; one, handicapped by hemophilia; one, a post-poliomyelitis case; and one, a post-encephalitis case.

TABLE I.—STATUS OF CHILDREN INCLUDED IN GROUP THERAPY MEETINGS

Name	CA in Years and Months	IQ	Handicap	Problem As Stated by School	School Grade	Sessions Missed
Ernest	8–3	63	Post-encephalitis with spasticity of left upper and lower extremity.	Immaturity, inability to grasp classwork or to settle down.	First	Nos. 7, 8
Daniel	9-0	103	Post-poliomyelitis with subsequent underweight and anemia.	Inability to adjust to group and get on in class. Withdrawal behavior; prefers to be alone.	Third	Nos. 1, 7, 9, 10
Janet	8-10	90	Cardiac, acute regurgitation with recent acute exacerbation.	Failure in work, inability to concentrate or sit still. Nervous and flighty. Immaturity.	Third	Nos. 4, 5, 6
George	8-5	101	Severe cardiac and chorea.	Failing in all subjects, refuses to try. Disobedience and negativism to teacher; bully.	Second	Nos. 4, 5, 8, 10, 11, 12
Peter	7-3	107	Hemophilia	Fights, bully, always wants to lead. Shows off, steals, lying, stubborn.	Second	None

The entire experiment took place in the course of about seven weeks during which time the group met twice weekly for fifty-minute periods. There was a total of thirteen meetings which

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the children could have attended. Table I indicates that certain sessions were missed by several of the children. The question of absence will be discussed elsewhere.[6]

The first nine meetings of the group took place in a vacant kindergarten room in the school. The room contained materials which were designed for children in a kindergarten class and not particularly for play therapy groups. It was a rather large room, measuring approximately forty by twenty feet, and containing a piano, desk, and several small chairs and tables for the children. There were numerous toys available to the group including games, puzzles, paste, crayons, blocks of all sizes, boxes and boards for building, blankets, balls, doll carriages, cabinets, beads, and other items. During the course of the therapy sessions a large three-dimensional doll house was added to the room. This was available to the children to play with, but there were no dolls which could be used with it. Finger paints were also made available to the children when they were requested. The tenth meeting of the group was held in a local psychological clinic therapy room in order to provide the children with materials somewhat more conducive to working out personal problems, but for both the eleventh and the twelfth meetings the children were returned to the original location. The thirteenth meeting was a Christmas party which was suggested to the children. All were wholeheartedly in favor of the party, and it took place in a different room from that used for the group play several afternoons after the last therapy session.

At the beginning of the program the teachers filled out an essay type report stating the main problems presented by the children. The parents filled out a similar report, although in some of the cases the children offered slight problems in the home situation. After the last meeting similar reports were filled out by teachers and parents who commented on observed progress made by the child during the period of time covered by the therapy sessions. None of the children had previous knowledge of the nature or purpose of the therapy program. Their first knowledge of the group came to them when the therapist (hereafter referred to as *C*) structured the situation at the beginning of the first meeting. He said:

> "We're here to have fun and a good time. This group is different from your classes. Here you may do anything

> that you would like to do. The only things which you may not do are to break any of the things in the room or to hit anybody."

Later, from time to time, it was necessary to establish other limitations in terms of requests made by the school administration. Some of the new limitations prescribed were the following: The teacher's desk and wardrobe were declared off-limits, cautions concerning use of the doll house were established, jumping off the piano was prohibited. An example of the technique used in presenting additional limitations to the group can be seen from an exerpt taken from the protocol of the third meeting:

> "I have been told that these closets have things in them which belong to the children and the teacher who are usually in this classroom. Also, these blankets on the shelf belong to the children in this class. So from now on we won't be able to go into the closets or to use these blankets. Mr. X will send up some other blankets and we can play on those. One other thing that I want to tell you is that when we paint, we must use the oilcloth so that we won't get any paint on the floor."

A verbatim report of conversations and activities in which the children engaged was made in a form as exact as possible. This record was kept by the therapist in order to reduce the number of adults in the therapy situation.

ANALYSIS OF GROUP THERAPY

It is the fundamental thesis of many volumes on the handicapped child that he is, first, a child who is subject to the same emotions as the so-called physically normal child. Baker[3] begins his book as follows: "The principal theme of this book is that exceptional children are fundamentally similar to normal children." It follows, therefore, that if a group play therapy program can in general provide a situation which will help children to work out their problems and achieve a happier life and better adjustment, this contribution will also be present where such therapy is applied to handicapped children. We have found this to be the case in the present study. The group therapy situation seems to provide for handicapped children

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two opportunities: (1) A situation in which the child can work out personal problems which are not related to the handicap and which might have been present had the child been of normal physique. (2) An opportunity to express and understand problems which are basically the result of the handicap. In the present report the therapy situations will be considered in the light of the above-mentioned division.

The first two meetings of the group were largely spent by the children in exploring the limitations of the situation and trying to see how real the apparent freedom was. The following illustrative excerpts are from the first and second sessions:

George: (In the middle of the first session, George started shouting and banging things around, enjoying himself, but apparently expecting to be curbed any second.) Gee, I never knew I could make all this noise in a room.

C: You like to make noise, but you usually can't!

George: Yeah, I'm making a lot of noise and having a lot of fun.

In the next or second meeting, Janet went to the piano and with a sudden swift move crashed down on it with her hand. She looked up at C. apprehensively.

C: You're wondering if it's all right to do that!

Janet: Yes.

C.: It's all right. That's something which you may do.

A little later Peter knocked down some flowers with a ball. He guiltily looked at C.

C.: You're wondering if it was all right to do that!

Peter: (Relieved) It's all right. (Continued playing)

It was interesting to watch the behavior of Daniel, a boy referred to the group because of his withdrawal behavior. He was at first completely withdrawn from the group and regarded the group from a distance. In a short time he began to feel the genuineness of the permissiveness, and, in a succession of violent moves, he smashed the piano, dashed a stick to the ground, and threw some blocks across the room.

By the end of the session there was considerable feeling of regret expressed by the children that there was no more time.

C.: I guess our time is up so I'm afraid we'll have to stop now.

Peter: Aw! (Closed self in closet)

C.: You're sorry that we have to stop so soon!
Peter: Yes.
C.: I'm sorry, too, but our time is up. We'll be able to play again on Friday.

The other group member, Ernest, a mentally-retarded, post-encephalitic boy, was content to remain apart from the others, and to have contact only with C. He sat next to C. contentedly.

C.: You'd rather be with me than play with the others!
Ernest: Yes (pause). I could kiss you. (Kisses C.)
C.: You like me very much.
Ernest: Yes, I like you. I like you; do you like me?
C.: You like me and you're wondering if I like you.
Ernest: Yes, I don't like people who slap me. I like you.

The first part of the third meeting was marked by considerable instability which was possibly due to the unforeseen presence of another adult. The children settled down toward the latter part of the session and got together in their first group activity, finger painting. All except Ernest shared the facilities and painted together harmoniously for the latter portion of the meeting. They enjoyed themselves very much so that to bring the meeting to an end was a rather difficult process.

Peter: Is it almost time to go?
C.: Yes.
Peter: How much more time?
C.: Three minutes.
Janet: Aw, gee. (Messed paints violently with both hands and looked at them.) Gee . . . I wish they'd stay like this.
C.: It's nice to have your hands all messy.
Janet: Mmmm. (Laughed) I wish I didn't have to wash them.
Peter: Aw, gee . . . It always has to end when we're having so much fun.
C.: You're sorry that our time is up . . . etc.

The fifth meeting found Daniel and Peter finger-painting. Daniel tired of this after a while and went off to play with some building boxes. Peter smeared paint over him and Daniel became very frustrated. His behavior became more and more

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aggressive as he smashed the piano, knocked objects over and threw blocks around. When Daniel heard that time was almost up, he went on a rampage, turning over tables and chairs.

Daniel: Time's nearly up. We've got other things to do. (Pounded piano, whirled chair around) Whee!
C.: It's really fun to toss the chair around like that.
Daniel: Yeah, it sure is.
Peter: C'mon, Dan, let's put these blocks away.
Daniel: Not me, I'm having too much fun with this chair.

Daniel continued his aggressive behavior. It seemed impossible to believe that the boy could be of a withdrawing nature in any situation. He was at a peak of aggressiveness and enjoying the whole thing thoroughly. Eventually the others joined in, though not so zestfully. Even Ernest got into the swing, and pushed desks and chairs all over the place.

Daniel: Aren't we devils?
C.: Sometimes it's fun to be a little devil.
Daniel: Yah, and how.
Peter: We moved all the furniture—boy, is this fun!
C.: I know you're all having a good time, but our time is up now and we have to go. (Peter and Ernest calmed down but this announcement spurred Daniel on to even more frenzied activity. He went around the room throwing and scattering the few things that he had missed up to that point.)
Daniel: Are we little devils! Is this fun!
C.: Dan is having such fun that he doesn't want to leave, but our time is up and we have to go now.
Peter: Hey! We can't go with the place looking like this.
C.: I know you want to help straighten the place out but our time is up, and we have to go now. (Daniel still was tossing things about. Peter and Ernest left with C. Daniel caught up, breathless and excited, and still talking about what devils "we are," notwithstanding the fact that he has done nearly ninety-five per cent of the 'damage.' He kept repeating how much fun it was, expressed concern over who would clean up the room, but concluded that he had had such a fine time that he was going to do the same thing again at the next meeting.)

This session was a complete catharsis of Daniel's pent-up feelings—feelings which were unleashed with a volcanic fury in a setting which permitted him to do so.

As the following meeting, the sixth, got underway Daniel decided to again engage in the aggressive behavior of the fifth meeting.

Daniel: Let's move all the furniture again. (Afterthought to C.) It's all right, isn't it?

C.: You want to make sure that it's all right to move the furniture again? It's all right. (Daniel started in, and George, who was absent for the last meeting, looked up in amazement.)

George: No . . . Don't do that.

Peter: Oh, you weren't here last time. It's all right.

(Daniel started violently at first. C. continued recognizing the feeling behind his action and accepting him completely. In about ten or fifteen minutes Daniel stopped, having made relatively little mess in the process. Again a period of equilibrium was present with Daniel, Peter and George building together. Daniel made no further attempt to upset the room.)

The next meeting, the seventh, found Janet back in the group after having missed three sessions. She saw a doll house (which had been added during the fourth session) for the first time, admired and played with it. The children acted out a spontaneous fantasy during this session (which will be discussed below). They expressed their feelings of enjoyment with this game, and left evidencing satisfaction.

At the next meeting, the eighth, an incident took place in which Daniel and Peter both wanted a piece of chalk. Daniel, originally shy and withdrawing, now used physical force in an attempt to pry away the desired object.

Toward the middle of the meeting, Peter removed his shoes and enjoyed it very much. Janet followed suit and started a fantasy involving a family situation with Daniel as her mate. Peter joined the play.

Peter: Why don't you take your shoes off, too, Dan?

Daniel: Leave 'em on. (Peter, with Janet's help, took off Daniel's shoes. They also tried to take his socks off.)

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Leave those socks alone, you. I've got a cold in my feet already and my mother said for me to be careful.

Here is to be seen the introduction of a family situation which represented a problem for Daniel.

The ninth meeting found Peter and George again partially undressing. In this regard they seemed to enjoy the opportunity to utilize the permissiveness which the therapy situation offered. Again, they acted out a fantasy using Ernest, who was not accepted as an equal by the other members, as the scapegoat. Later they settled down and simulated a camping and sleeping outdoors experience.

Before the eleventh meeting got underway, C. was informed that due to the severity of his heart condition George would no longer be able to participate in the group. C. called for the other group members in their rooms. When Peter saw him, he called C. over.

Peter: (Pointed to a package) This is a present I brought for Johnny. (Smiled shyly) I'm going to bring you a Christmas present. Are you married?

C.: Yes.

Peter: O.K., then I'll bring your wife a present, too.

(Then the group started for the playroom. Peter, who usually ran ahead, stayed behind and held C's hand.)

Ernest: Aren't you going to run ahead today?

Peter: Oh, no. I'm going to hold his hand today. (Rested his cheek on C's hand and shyly kissed it.)

Upon arriving at the other class, Daniel's teacher was uncertain whether or not Daniel should join the group because of a hand injury sustained the week previously, and she asked C. to resolve the issue. He, in turn, passed the decision on to Daniel.

C.: Would you like to come up and play with us today, Dan?

Daniel: (Came running over and smiled) Y-e-s-s.

C. broached the possibility of a party and all the children accepted eagerly. They inquired about George and were told he wouldn't be with the group any longer. Janet seemed very enamoured of Daniel and didn't hesitate to say so. In the middle of a game she attempted to go into the wardrobe which was out of bounds. C. cited the limitation to her, but in stressing

the limitation did not fully accept her. She was quite frustrated, and entered into markedly aggressive activity by upsetting everything in her path. Daniel helped Janet with his one free hand, while Peter and Ernest unsuccessfully tried to stop them. After the room had been upset Janet and Daniel played a game acting as husband and wife. It was interesting to note in this connection that Janet, who several times started games of this type, is without a father.

Janet: I kissed Dan on the head.
C.: It was nice kissing Dan.
Peter: (Observing nonchalantly) That's one thing we can do, isn't it?
C.: Yes.
Janet: (Sighs) Ooh . . . my husband!

(Janet and Daniel went off to build their own house and have a little privacy. Peter and Ernest picked up a small portion of the felled items, but before the meeting was over Janet threw them over again. This session was quite a catharsis, although probably incomplete, for her. It undoubtedly was magnified by C's failure to simultaneously enforce the limitation and to accept her earlier in the meeting.)

The final meeting is presented as fully as C. was able to record, both to provide some idea of the technique of the on-the-spot evaluation and to give the reader some idea of the status of the group at its conclusion.

C. called for Janet and Daniel first and both were present. Daniel had his arm in a sling once again. Janet threw her arms around C. and exclaimed that she thought that he would never get there. She said to Daniel, "Let's mess the place up like we did last time, Dan," but Daniel didn't answer. C. said, "You had so much fun last time that you would like to do it again." We then called for Peter and Ernest both of whom were present and all five started out for the playroom. Nobody ran ahead, which was quite unlike any of our previous meetings. All walked up slowly and leisurely discussing Christmas parties, things being made for them and so forth. When we got to the playroom, the children all crowded around the Christmas tree which was decorated. Various remarks were made as to how

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nice it was and about the decorations, and they then headed for the tree itself which had been indicated by Mrs. X as out of bounds.

C.: I know you would like to play with the ornaments, but this tree belongs to the children in the kindergarten, and so we may not touch it.

Janet: (Turns away) Let's throw everything around. That's lots of fun. Let's get the room all messed up. C'mon! (She ran over to the block cabinet and was about to tip it over with its entire contents.)

Daniel: No, don't do that, Janet. (Janet tipped the cabinet anyway and blocks scattered all over the floor. She picked up a carton and was about to throw it down, too.)

Peter: Stop it, Janet. Lookit what you did already. Stop throwing everything around.

Janet: (Undaunted) I won't. I'm going to upset everything. (She scattered and kicked things all over the room.)

Peter: (To Janet) Will you stop already? (Janet wouldn't) (To C.) Make her stop doing that. She's getting the room all wrecked.

C.: I know that you'd very much like me to make Janet stop, but messing the room is one thing that we can do. (By this time only about five minutes had passed but the room was a shamble entirely through the work of Janet.)

Janet: Whee! (Scattered more blocks) (Laughed and smiled)

C.: It's nice to be able to mess the room. (By this time the contagion of Janet's escapade had caught hold. Peter and Daniel joined. They turned over all the tables and threw boxes and chairs all over the room.)

Daniel: Boy, aren't we little devils?

C.: Sometimes it's fun to be a little devil.

Daniel: Yeah, it sure is. (He stopped. Peter stopped, too, and surveyed the damage in horror.)

Peter: Aw, c'mon, let's stop this. If you stop it I'll let you all have some of my candy. (All stopped and Peter pulled out a little bag of candy which he distributed to all.) (To C.) You want a piece, too?

C.: Would you want me to have one, or would you rather keep it?

Peter: I want to give you some. (Gave C. some which C. ate.)

Peter: (Looks down at some of the blocks and spots an oblong block.) Hey, you know what? This here block looks just like a quarter of a pound of butter that we have at home.

C.: (Laughs) It sure does. (He glanced around the room and noted that Janet had continued her wrecking party, and that off in a corner Daniel was struggling with one arm to pick up one of the upturned tables.)

Daniel: Will you help me pick this up?

C.: You'd like me to give you a hand, because you can't manage with one hand. (He did. Daniel started picking up the chairs and setting them around the table.) You want to help straighten out the place.

Daniel: Uh huh! (He went about picking up everything that Janet had turned over workings lowly because his arm was in a sling, but at the same time conscientiously. Peter, too, picked up a few things here and there. He came over to C. and tapped him.)

Peter: How about a horseback ride?

Janet: (Who wasn't messing the room anymore, but toying with the blocks in the center of the floor.) I want one, too.

Peter: I was here first, don't give her a ride.

Janet: Give me a ride.

C.: Peter and Janet want a piggy-back ride and both can have it, only we'll have to take turns. (They did. After finishing the ride, Janet ambled over to the doll house. Ernest was sitting on the one standing table taking in everything, while Daniel continued to use his one free arm in an attempt to straighten the room. Peter surveyed the room and shook his head.)

Peter: (Went over to Janet.) Boy, oh, boy! Look what you did—cabinets all over, blocks all over the place, chairs you threw down! The room is a mess. What do think you're doing?

Janet: (Who had opened the wardrobe door.) So what if I did? I can do it if I want to here.

Peter: Yeah, but you're not 'a-posed' (supposed) to.

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Besides, one thing you can't do here is to go in the wardrobe.

(Janet went off to the center of the floor and continued to build some things with some of the blocks which she had scattered. Daniel and Peter, particularly Daniel, worked rather feverishly in putting the room in order again.)

Peter: Could I have another ride? (C. took Peter for a ride again, and it turned out to be a rather lengthy one with C. none the better for the wear.)

Ernest: (Recognized C's feeling.) S-a-ay . . . you're hot.

C.: (Put Peter down.) I'm pretty hot, all right. (Peter went to toilet and C. sat down next to Ernest. Both watched Daniel continuing to put things away.)

Ernest: (Pointing to Daniel's arm.) He has to use one arm.

C.: Daniel can only use one arm to put things away.

Ernest: Yes. Why are you writing in that book?

C.: You want to know why I'm writing. I'm writing about what we do so that I can read about it when I go home.

Ernest: Do you have a home?

C.: Yes.

Daniel: Say, how much time do we have left?

C.: Twenty-five minutes.

Daniel: Boy! We'll have to hurry if we want to get this place straightened out in time.

Peter: No we don't. Twenty-five minutes is lots of time. (Daniel worked even faster.)

Ernest: (Screamed. Then Peter, Janet, Daniel all took turns screaming at the very top of their lungs, each trying to outdo the other.)

C.: It's nice to be able to scream as loud as you want to. (Various remarks of agreement.) (C. looked around and noted that Peter is taking a swat at Janet.)

Janet: Go away from me, Peter! Stop hitting me! Stop! (Peter didn't stop. He slapped her angrily.)

C.: I know you're angry, Peter, but one thing which we can't do is hit.

(By this time Janet was crying, more in frustration than in pain.)

Janet: He hit me for no good reason. (Sobbed.)

C.: It just doesn't seem fair at all that Peter hit you.

Janet: No. (Slackened her crying but Peter came over and hit again. This time Janet really burst into tears.) Whaaaa. Stop it, Peter. I don't want to stay here any more. I'm going to go downstairs. I'm going back to the class. Why does Peter keep hitting me?

C.: Peter has hit you so much that you don't want to stay here anymore.

Janet: (Continued sobbing.) Yeah. I'm going. I'll go to the 'basement.'

(She left the room sobbing. Peter saw that Janet was really leaving and was sorry.)

Peter: Don't go, Janet. (Janet left.) Aw, gee, I didn't mean nothing.

Daniel: (To Peter) Oh-oh. Now it's curtains for you, Peter.

Peter: What do you mean, "it's curtains for me"?

Daniel: I mean you made Janet go and you're all finished now. You're all washed up.

Peter: (Getting back at Daniel.) Dan loves J-a-n-e-t.

Daniel: No I don't. She loves me.

(In a few moments, Janet came back feeling a lot better and smiling. Peter went past Ernest and jostled him.)

Ernest: Leave me alone, you stinker.

C.: Peter is angry at Ernest, too, but we may not hit here.

Peter: Well, he hit me with a board last time, and now I've got a black and blue mark all over my leg. (Showed C.)

Ernest: (Who had forgotten the episode.) No I didn't.

C.: I can see that you would be angry, Peter, but one of the things we may not do here is to hit.

Peter: Yeah. I'm sorry I hit you, Janet and Ernest. I won't do it anymore.

(Daniel had been putting the things away all this time. Ernest helped putting some blocks away. Peter gave a hand and between the three they had the entire mess, which Janet had made, cleared away. Janet looked at the goldfish. She didn't help put things away but she didn't upset anything. Peter worked like a little demon. Suddenly he looked at C. with a very puzzled expression.)

Peter: Gee! I want to be sure that we get everything put

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away, but I'm getting very tired. (Scratched his head and looked up at C.) Would you mind very much putting the rest of these things away after we go?

C.: I'll bet you're really tired of doing that. Sure, I'd be glad to put them away later.

Peter: Could I have a ride again, horsey?

Janet: I want a ride, too.

C.: Well, I'd be glad to give you both rides, but you'll have to take turns.

Both: Me first!

C.: Well, I can't take you both at the same time so one will have to wait. (Went to take Peter.) Since you asked first, I'll take you first, Pete. How's that, Janet?

Janet: All right, but hurry.

Peter: You could go first if you really want to, Janet. (Janet did, and C. took them both for a ride.)

Ernest: You know what? My father painted my room.

C.: Your father painted your room.

Ernest: Yes. Could I have a piece of paper?

C.: Sure. (Gave Ernest a piece from his pad.)

Ernest: I could write my name. (Did)

C.: You're quite a fellow to be able to write your name.

Peter: Our time is almost up, isn't it?

C.: Yes. (Peter starts putting the shade up and down. Daniel, who has done a workmanlike job of straightening out the room, went over to the Christmas tree and redecorated the tree in a spot where a few of the trimmings had fallen off.)

C.: It's really fun to fix the trimmings.

Daniel: Mmmmmmmm. Yes.

Janet: (Found a couple of cans which she put on her feet.) Look! I've got high heels!

C.: You've got yourself a pair of high heels to walk around in. Well—I guess our time is up now.

Peter: (Screamed) Oh, no!

C.: You're sorry to see it end.

This was the last session and it contained several interesting developments or signs of growth. It was interesting to note that for the first time there was a block of group members who actively opposed upsetting the room. Three of the boys pleaded

with Janet not to throw furnishings around, but she did so anyway. It is the opinion of C. that her aggression might well have been a carry-over from the hostility which she showed in the eleventh meeting. However, the other members of the group did not partake in the destruction. Daniel failed to stop Janet by plea, but Peter succeeded in doing so by using candy as a bribe. From that point on the trend of the group was toward restoration of the room with Daniel and Peter contributing materially to the job. Ernest helped a little more slowly. All of this activity was voluntary and without pressure of any kind. Towards the end of the session, Peter very humanly expressed his tiredness and asked C. if he would mind completing the job. While this attitude which was expressed by the children may be something which will meet situational reverses, it does represent a definite improvement in attitude and behavior from that shown in earlier meetings insofar as Daniel and Peter and Ernest are concerned. With respect to Janet, it is the writers' opinion that this was a very critical meeting for her. She was definitely frustrated and aggressive. She was alone in opposing the wishes of the others. The aggressive behavior typical of Daniel in earlier therapy sessions was replaced by an expressed desire to keep the room in order and to have the children conform in a socially acceptable way. His earlier withdrawal behavior had been substituted by wholesome group participation and overt expressions of responsibility.

The thirteenth and last meeting of the group was not therapeutic in the usual sense. It was a Christmas party for the children as they had planned it during the eleventh session. Several of the children expressed considerable sorrow that they could not have the group any more. Peter asked if "we couldn't possibly meet on Saturday," and Janet expressed the hope that the meetings would never end and said that she didn't want to leave the group. The children asked if they would see C. again. He explained that there would be no more regular meetings, but that he would come to school from time to time and would stop and see them if they so desired. The children urged him to do so, and the session ended with everyone in good spirit.

We have thus far summarized in skeletal form the progress of group therapy in an attempt to establish the point that the normal course and contribution of such a program in the case of

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physically normal children with emotional problems is to be found in this therapy group for physically handicapped children. The writers do not wish to stress the artificial dichotomy which has been created by their division between therapy for physically normal and handicapped children. In essence the group therapy situation has the same value for a physically handicapped and normal child with the exception that, other things being equal, the handicapped child may bring to the therapeutic setting a wider range of problems than the normal child due to the impact which the handicap exerts on the former child's ability to adjust. With this in mind the writers wish to discuss the second major contribution of the group therapy situation to the handicapped, i.e., the provision of a permissive atmosphere in which socio-emotional problems related directly to the handicap may be resolved.

Reference has been made at several points to some of the spontaneous fantasies which took place during the therapy sessions. Two of these fantasies will be presented in detail now concretely to illustrate the point that the experimental non-directive play group provided an opportunity for physically handicapped children to work out emotional concomitants of their physical disability. The following is quoted from the protocol of the seventh meeting:

> George climbed on the piano and leaped off simulating a parachute jump. He jumped from a standing position atop the piano. Janet was impressed. She, too, climbed up and when she reached the top was a little scared by the height.
>
> Janet: Oooooh, boy! (To George) I'm coming down in my parachute, too. (She jumped down from a sitting position, but George was looking elsewhere.) I jumped in my parachute, too. (George climbed up and jumped and started to roll across the floor. Janet followed and they rolled together.)
>
> George: (Kept rolling.) I'm sinking into the ocean. You save me, Peter. (Desperately Peter pulled him by the arm.) Pull my other arm, Janet. (Janet grabbed his other arm and they both pulled him across the floor.) I'm in the hospital now. Cover me with the blanket. (They did.)

Janet: I must get the medicine.
Peter: No, I must.
George: I'm not in the hospital—I'm on a boat.
Peter: Yeah, but you're sick. It's a hospital boat.
Janet: The patient is moving. He's getting up.
George: I'm better. I'm going to the airport. (He climbed up on the piano and made believe he was in a plane.) I'm shot. I've got to bail out. (He jumped.) (Peter was standing off to the side.)
Peter: George is on the ground.
George: (Spied Peter.) Let's make believe you're a German. (He jumped on Peter and wrestled him to the ground.) I've got you covered. (He used a stick for a gun; Janet helped.) Don't try any tricks, you dirty schwein! I've got you covered with my trusty luger, and I'll shoot you dead.
Peter: I must be one of your friends, now. (All three climbed on the piano again as if in a plane.)
George: Shoot the house down. That must be a German house.
Peter: I'll go down and get some bombs and guns. (He climbed down and got some cylinders to use for hand grenades. All three made believe they were shooting at an imaginary plane in the air and threw sticks (bombs) on houses.)
George: I'm shot! (Clutched heart.) Jump for your life!
Janet: (Jumped after George, leaving Peter alone on the piano.) Peter, you're shot, too.
Peter: (Not keen on the prospect of jumping.) No. I'll get down and look at the houses that we bombed. (He climbed down.)
George: (Still on the ground.) You find out that I am half-dead.
Janet: Half-dead? He's half-dead. Cover him with the blanket. I'll get some ice cubes.
Peter: I'll get some medicine and I'll see if there are any Germans around.

(Janet brought over a bottle of enamel chips, ice cubes, but George kicked them over.)

Peter: Now why did ya hafta go and do that?

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George: Those aren't O.K. for me.
Peter: There's a German hiding over there. I see him but he doesn't see me.
George: I must think that you are a German by mistake. (Jumped on Peter and threw him down.)
Peter: No. I'm your friend.
George: O.K. (Let him go.) There goes a Jap. He got me. I'm shot. Get him, Peter. (Peter shot him with his tommy gun. Peter half carried George across the floor. George staggered because of his 'wound.' They decided to make believe that Janet was a prisoner. They questioned her and made her tell when the commander of the enemies was coming back. They laid in ambush under the table until he did return. Then they opened up with a furious barrage and shot at this nebulous enemy.)
George: They got me. (Fell.)
Peter: No. You always get shot.
George: You must get shot with me this time.

It is interesting to note that George played the rôle of one who was shot, who must be rescued, and who even used the term 'half-dead' in connection with his condition in the fantasy. In the real life situation, George was a boy who, because of the seriousness of his cardiac condition, had spent the best part of the last four years in hospitals. It is small wonder that he now conceived of himself as incapacitated, and 'half dead' even in his play activity. So consistently did he adopt the rôle of the wounded one, or the rôle of the person who must be cared for by the others, that even Peter noticed it. On one occasion Peter exclaimed, "No—you always get shot," and challenged George's right to that rôle. The rôle which George habitually assumed is an interesting illustration of his self-concept which evolved due to his experience of continued hospitalization.

An equally effective and possibly more dramatic illustration of the importance of group therapy to the expressions of emotional problems resulting from physical disability appears in the protocol of the ninth session. In a spontaneous fantasy acted out by Peter during the ninth meeting and using C. as an aid, the following activity took place:

Peter: (To George and Janet) Do you want to play cowboy and crook? (No response.) (To C.) Would you be the robber?

C.: You'd like me to play the robber. I'll be anything you'd like for me to be.

Peter: Okay. You must sit down here. (C. sat down on the piano chair and Peter tied him up very flimsily.) Now I must cut your finger off. (Peter took a pair of scissors and went through the motion of cutting off a finger.)

C.: You're going to cut off a finger. (Peter cut it off.)

Peter: (Very realistically.) Oooooh—it's bleeding!

C.: You cut off my finger and now it's bleeding.

Peter: I'll cut off all your fingers now. (Went through the motions.) They all are bleeding. You're losing all your blood. Maybe you'll bleed to death.

C.: You think I may bleed to death.

Peter: We'll have to save the blood. (Runs and gets two jars and puts C's right hand in one jar and the left hand into the other.) All your blood is dripping into the jars. (He filled up the two jars which he had.) It hasn't stopped, you're still bleeding to death. I must get some more jars. (He got some more jars and filled them up with the blood from C's fingers.)

Peter: Now look at all the blood we have. (To the others) Look, we've got all these jars full of blood. We've got all this blood in case anyone gets hurt and needs blood. (Suddenly he realized C. was bleeding to death.) We must get some medicine to stop the bleeding. (He poured some grains on C's hand.) Leave them there, it hasn't stopped bleeding yet. (After several minutes he shook the grains off into a box.) It's better now. It looks like it's going to stop. I'll untie you now. (Untied C.) Could I go for a ride? (C. took him for a ride.)

Peter, a child who was handicapped by hemophilia, here enacted a fantasy graphically illustrating the impact of the problem for him. Insofar as C. was able to observe, Peter was completely unaware at a conscious level of any relation between his fantasy and his handicap. It developed quite spontaneously, yet there seemed to be little doubt of the presence of such a

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relation. This was particularly true since Peter went out of his way to "cut off the bandit's fingers," an extremely purposeful and unique move. His actions during the entire scene were dramatic, painstaking and realistic. He collected blood, in the jars as if the cut hands really were dripping blood. He created a threat of death for the bleeding victim, indicating the possible seriousness of the problem in terms of his own meanings, and suggesting a possible diagnostic contribution of the group.[11] However, at the end of the fantasy the victim was saved by means of medication. Peter, who evidenced sincere fright during the fantasy, appeared relieved and emotionally unburdened when it was over. Quite possibly it was coincidental, but it nevertheless was interesting to note the following interchange between Peter and C. as the session closed several minutes later.

Peter: Gee, we really had a nice game today.
C: It really was fun today.
Peter: There just isn't anybody in the whole school as lucky as us kids.
C.: Today sure was lots of fun.
Peter: More than any other time.

It would seem from the examples noted above that the nondirective play-group offers an ideal setting for the self-solution of a particular type of emotional problem; namely, those stemming from the specific disability of the physically handicapped child. More generally, it helps the handicapped child to come to a more satisfactory adjustment as a child, which is the chief contribution which the group play technique offers to physically normal children.

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FACTORS IN MIRROR DRAWING

ROBERT M. ALLEN

Department of Psychology, The University of Miami

INTRODUCTION

Progressive interest in human behavior necessitates periodic reexamination and reevaluation of techniques utilized in the study of the learning process.

Sixteen years ago Allen, in collaboration with Crafts, undertook a study in motor learning.[3,4] In this earlier study, "the object of the experiment was to determine whether an activity requiring ultimately the simultaneous use of the two hands . . . would be better learned by practicing it first with each hand separately, . . . or by practicing with both hands together from the beginning,"[3](p. 459). In the present study the problem was divided into two parts: (1) to study cross education in a motor act involving the use of both hands, and (2) to test the efficiency of the simultaneous and successive methods* of learning a perceptual-motor task, i.e., mirror drawing.

Weber[12] was one of the early experimenters to have noted the phenomenon of bilateral transfer of training (more specifically cross education). In a communication to Fechner he stated: " . . . training with the right hand will influence, unconsciously, the ability of the left hand to perform similar symmetrical movements." From this simple beginning a rather rich literature resulted. Wissler and Richardson[13] attempted to give a physiological explanation for cross education. Their experimental results led them to postulate a "diffusion of the motor current (neural impulse) in the arm." This neural innervation, then, did not confine itself to the used arm and hand but spread to the other, non-used, arm and hand. Goldschieder[6] offered the following interpretation of the effects of practice: " . . . if in a certain person the motor sensations have a greater influence than the optical percepts, then by transference of the motor sensations

* By a successive method is meant practice to the learning criterion first with the preferred hand, then with the idle or non-preferred hand, followed by the simultaneous use of both hands. The simultaneous method requires practice with both hands from the outset until the learning criterion is achieved.

a movement is made on the other side that is symmetrical to the movement practiced. This symmetrical movement produces the writing in the reverse direction."

Other investigators were not interested in delimiting the organic bases of transfer but were more concerned with the results of this process. Dearborn[7] used the mirror-drawing technique to illustrate trial and error learning and only incidentally cross education. Bray[2] was the first to suggest that transfer was in a large measure due to the familiarity of the general situation gained by the S. Dashiell,[5] Barton,[1] Perrin[11] and Koch[8] inquired into the question of motor learning and the use of the hands in practicing the act. The experimental learning problems included mazes, card-sorting tasks, and learning to type. In each instance the investigators found transfer taking place to the advantage of easier learning by the non-preferred hand after practice with the preferred hand.

The present investigation goes further into the attempt to answer the question of factors involved in learning a motor task. The terms 'whole' and 'part' for practice with both hands together and each hand separately, respectively, seem to be out of place. The author suggests the use of the previously defined designations of simultaneous and successive methods of practice.

METHODS AND PROCEDURE

Subjects:—The S's were ninety undergraduate students in elementary and advanced psychology courses. These were divided at random into three groups. The Simultaneous Method group (Sm) consisted of eleven men and nineteen women; the Successive Method group (Sc) included twelve men and eighteen women; the Control group (C) was made up of sixteen men and fourteen women. All S's were right-handed and had had no previous mirror-writing experience.

Apparatus:—(1) A mirror 22″ long and 14″ wide was held in place in a vertical position by screen wire attached to the sides of the table and the wall. (2) A strip of black cardboard 20″ long and 12″ wide. (From it was suspended a black cloth.) This was held in a horizontal position by clamps on two metal stands. The S was thus prevented from seeing either his hands or the test designs directly. The only view was that reflected in the mirror. (3) Two electric lights under each end of the board assure a

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uniform light sufficiently bright to minimize shadow effects and increase the amount of light thrown on the designs. (4) The remainder of the required materials included hard lead pencils, stop watch, and the sheets with the design printed thereon. The design consisted of eight alleys, each alley was 2½" long and 5/16" wide. The alleys were designated by number (which did not appear on the design sheet) from 1 to 8 starting at the S and going around in a clock-wise manner.

Methods of Practice:—The Successive Method group S's made a first trial record with the left hand, after which they practiced with the right hand up to the criterion of learning, followed by practice with the left hand until the same criterion was attained. This criterion was in each case to trace the design within one minute and with not more than one error. They then practiced with both hands together until they could trace the design within two minutes and with not more than two errors with each hand. This is known as simultaneous integration. In working with both hands, two designs and two pencils were used. The papers on which the designs were printed overlapped about one inch.

The Simultaneous Method group S's practiced throughout with both hands together until they could trace the designs within two minutes and with not more than two errors with each hand. This criterion was chosen because preliminary work with this design indicated that a S could not usually meet a more severe standard within one class period.

The S's in the third group, control group, made only two records—both with the left hand. The first trial was followed immediately by a second tracing. Thus the C group served as a check on cross education effects in the Sc Method. All the work was massed; the S's completed the tracings at one sitting.

Instructions:—The usual mirror-drawing instructions were given to the S's with the following added precautions:

1) You must observe your movements only in the mirror; do not look at your hands or the papers directly.

2) Do not cross the lines bordering the pathway; every such crossing is an error and the score will be based upon errors of this type.

3) Do not lift the pencil from the paper; if you go beyond the border, trace the line back as near as possible to the point of

departure from the pathway. One complete trial is from 'S' around the design to 'S.'

4) Coördinate your movements as much as possible when working with both hands together.

Scoring:—Scores were kept in number of trials, errors and the amount of time in seconds. An error was defined as crossing the lines on either side of the pathway. In the Sc Method each trial was considered as a half trial when the hands were used separately in practice.

RESULTS

Cross education:—The effects of bilateral transfer of training are obtained from an analysis of the data for the Sc and C groups. Table I discloses the extent of improvement of the S's in the Sc group for both time and errors as a result of the practice with the right hand. Their time required to complete the design with the left hand decreased from 74.6 to 43.2 seconds, a difference of 31.4 seconds which is statistically significant. The C group S's decreased their design-completion time from 72.9 to 63.2 seconds —a difference of only 9.7 seconds. In the area of the number of errors clearer results were obtained. The Sc group, as a whole, cut its average errors for the two left-hand trials from 4.5 to 1.3 with a critical ratio of 7.2. This compares very favorably with the data for the C group. These S's did not decrease their average number of errors from the first to the second left-hand trial. As a matter of fact, there was an increase from 5 to 5.6 errors for the group between the first and second left-hand trials. Incidentally, the reduction in time and errors was recorded for each of the thirty S's in the Sc group.

The soundness of cross education effects finds further support in Table II. The insignificant difference between ScL_1 and CL_1 was not unexpected, since both were first trials with the left hand. The differences for time and errors between ScL_2 and CL_2 were, on the other hand, patently reliable.

How are these findings to be interpreted? In just this manner: ScL_2 which followed ScL_1 only after a practice series with the right hand, was greatly improved; CL_2 which followed immediately after CL_1 with no right-hand practice was not as much improved.

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TABLE I.—CENTRAL TENDENCIES AND RELIABILITY OF DIFFERENCES FOR TIME AND ERRORS OF ScL_1, ScL_2, CL_1, AND CL_2*

	TIME**	Diff.	PE_{diff}	$\frac{Diff\dagger}{PE_{diff}}$	ERRORS	Diff.	PE_{diff}	$\frac{Diff\dagger}{PE_{diff}}$
ScL_1	74.6 ± 3.7				4.5 ± .49			
		31.4	3.2	9.8		3.2	.44	7.2
ScL_2	43.2 ± 1.4				1.3 ± .18			
CL_1	72.9 ± 3.9				5.0 ± .4			
		9.7	1.4	6.9		.54	.48	1.1
CL_2	63.2 ± 3.5				5.6 ± .69			

* ScL_1—first trial of the Sc group S with left-hand prior to right-hand practice. ScL_2—trial with left hand immediately after learning with the right hand. CL_1 and CL_2—left-hand trial of C group S with no intervening right-hand practice.

** Time is expressed in seconds.

† This is the Critical Ratio.

SIMULTANEOUS VS. SUCCESSIVE METHODS

Table III presents data definitely in favor of the successive method for learning mirror-drawing. The differences between these two methods are highly reliable for time and errors only. It is best to base conclusions for the economy of learning more on time and error scores than on the number of trials. A trial is an arbitrary work unit; it serves the purpose of giving the E and S a starting—and end—point. A trial as such could not be considered a criterion for generalizing.

TABLE II.—DIFFERENCES AND RELIABILITY OF DIFFERENCES FOR TIME AND ERRORS BETWEEN (ScL_1-CL_1) AND (ScL_2-CL_2)

	Time	PE_{diff}	$\frac{Diff}{PE_{diff}}$	Errors	PE_{diff}	$\frac{Diff}{PE_{diff}}$
ScL_1-CL_1	1.7	5.2	.32	.56	.64	.87
ScL_2-CL_2	20	3.8	5.2	4.3	.71	6.05

Again, from Table III may be cited statistical evidence of the efficiency of the successive method. The difference between the error score for the right hand when trained by the successive and simultaneous methods is 36.3 with a critical ratio of 9.8. The same data for the left hand discloses a difference of 33.5 errors in favor of the left-hand successive method training over the sim-

TABLE III.—CENTRAL TENDENCIES, DIFFERENCES AND RELIABILITIES OF TIME, ERRORS AND TRIALS FOR BOTH METHODS OF LEARNING AND RIGHT AND LEFT HANDS

	TIME	Diff	PE_{diff}	$\frac{Diff}{PE_{diff}}$	ERRORS	Diff	PE_{diff}	$\frac{Diff}{PE_{diff}}$	TRIALS	Diff	PE_{diff}	$\frac{Diff}{PE_{diff}}$
Successive	548.8 ± 23.7				34.9 ± 1.8				5.1 ± .13			
		416.9	35.5	11.7		68.1	6.6	10.3		1.8	.75	2.4
Simultaneous	965.7 ± 26.4				103 ± 6.4				6.9 ± .2			
Right hand (Sc)					17.2 ± 1.1							
						36.3	3.7	9.8				
Right hand (Sm)					53.5 ± 3.5							
Left hand (Sc)					17.4 ± .94							
						33.5	3.7	9.1				
Left hand (Sm)					50.9 ± 3.6							

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ultaneous method. The critical ratio for this difference is 9.1. Both differences are reliably significant.

Superiority of the efficiency of the successive method may be explained in a large measure by the interaction of the following operational elements:

A) Cross education—considered earlier in this paper;
B) The principles of mechanization and elimination;
C) Familiarity with the general situation;
D) Writing habit;
E) Speed vs. errors;
F) The position of the alleys.

DISCUSSION

A) Cross education.—There is no need to repeat here the material given previously.

B) The principles of mechanization and elimination.—After a series of trials the S learned how to trace a design seen in the mirror. The S, in the successive method, allowed two principles to operate which in the simultaneous method did not take place to as great an extent or as early in the process. Pechstein[10] explains these two principles: "The longer and more difficult the problem the greater the task upon the learner to see the many details of the problem and to learn to eliminate the faulty reactions. Confusion, hesitation and emotional conditions all operate to delay the learning. The part* method gives the eliminative process ample opportunity to operate. The final stage is no longer explorative, but rather mechanizing and rendering habitual the entire activity. In the whole† method this mechanizing is delayed by the constant presence of the eliminative principle.

"The (successive) method utilizes the two principles to the best advantage. The explorative or eliminative principle is operative when the details of the short and easy parts (in this study one design at a time) are being grasped, it being made clear that the best elimination is aroused by massing the learning of each short part. The time becomes ripe, logically and psychologically speaking, for the mechanizing principle to operate."

* Successive method of this study.
† Simultaneous method of this study.

The successive method secures the mechanization of activities needed to trace the design one hand at a time, and then the habit is built up for both hands.

C) Familiarity with the general situation.—Bray[2] offers: "The explanation of this form of transfer lies in part in the transfer of methods which, having been learned for one part of the body, are carried over in practice with some other part. Mere familiarity with the setting of the experiment is always so important in transfer."

At this point it may be possible to formulate an answer to the question raised in the Introduction. When each part of a situation is learned separately and then simultaneous integration is attempted, the S is familiar with the general aspects of the problem. The hands were formerly mechanized for the task to be performed separately (in the successive method); all that remained was for the S to orientate himself to the new situation of using both hands together where previously he had employed one at a time. Immediately the mechanizing and eliminative principles began to operate and become reinforced. The S transferred the general knowledge of the first situation (each hand separately) to the new situation (simultaneous integration). This follows whether an irradiation of impulse theory or a general aspect theory is adhered to.

To sum up, the successive method had a twofold advantage in the early appearance of the mechanization of the correct movements, and the elimination of the incorrect responses; and cross education. The simultaneous method, to be sure, utilized the two principles later in the learning process, but not as completely as the successive method S's. Pechstein[9] concluded: "Part method and massed learning—so long anathema to the pure and educational psychologist—may not be understood one apart from the other; employed together they make the best arrangement for learning a difficult motor problem."

Since all of the work was done at one sitting, the successive method offered the ideal conditions of 'part' and 'massed' learning.

D) Writing habit.—Most S's reported that the left hand was easier to trace with than the right. Table III shows the results for both methods; in the successive method there is a .2 error difference in favor of the right hand. A comparison of error-

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means for L_1-R_1 of the successive method and the same measure for the simultaneous method is shown in Table IV. Their differences are not highly reliable. Common sense would lead to the expectation of greater efficiency with the right hand than with the left. It should be kept in mind that this experiment deals with an abnormal writing task; hence with the right hand the established habit of normal writing must be replaced with this new mirror-writing habit. The left hand had merely to build up a writing habit. The transfer effect that had accrued through years of writing with the right hand was lost in the confusion of orientation to the new situation, totally unfamiliar. With the new habit finally established through practice, the right hand fared better than the left. The left-hand writing had little or no effect on the S, but the mechanization and eliminative principles appeared late in the procedure. Thus right-hand confusion was balanced by the delayed appearance of these two principles in the left-hand practice. The error scores tended to approach each other.

TABLE IV.—MEANS, DIFFERENCES AND RELIABILITIES OF DIFFERENCES OF ERRORS ON FIRST RIGHT- AND LEFT-HAND TRIALS FOR BOTH METHODS

	Errors	Diff	PE_{diff}	$\frac{Diff}{PE_{diff}}$
ScL_1	4.5 ± .49			
		1.5	.43	3.5
ScR_1	3.0 ± .36			
SmL_1	15.2 ± .9			
		1.6	.73	2.2
SmR_1	13.6 ± .01			

E) Speed vs. errors.—Another phase of the problem is the tendency of the S to reduce the time per trial considerably during the first few trials until the criterion had been attained. This was then followed by a decrease in the number of errors. This accounts in part for the less time required for the successive method. Koch[8] explained this as follows: "Time decrease for the successive method is due not only to less number of trials, but also to the greater speed of the S. Speed curves reveal that the successive method group, when simultaneous integration is attempted, has a speed considerably greater than that exhibited

by the simultaneous method group in the initial stages of learning, though far from the speed which each hand separately attained. Progress to a higher speed is more rapid in the successive method."

F) Position of the alleys.—In checking the errors E found that the majority of the S's made consistent errors in Alley 5; next to it in error consistency was Alley 1 since it marks the entrance or beginning of the test design. Why an S should experience more difficulty at Alley 5 than at Alley 1, E is unable to explain. Introspective data furnished no clues.

SUMMARY AND CONCLUSIONS

The object of this experiment was to extend a previous study to determine the efficiency of rival methods of learning mirror-drawing and to report on transfer effect, or cross education. The designs to be traced involved a definite novel learning problem. Results obtained substantiated those found by Koch, Dashiell and Crafts and Allen.

1) The successive method is more efficient than the simultaneous method for learning mirror-drawing.

2) The successive method is most efficient for time, then errors; as for trials, it follows the general tendency of the other two factors.

3) The mechanization and elimination principles are important factors in deciding the efficiency of one of the rival methods.

4) Cross education from the right hand to the left takes place. This is a second major contributor to the efficiency of the successive over the simultaneous method.

5) The left-hand performance is almost equal to the right-hand, according to the final result scores.

6) The S tends to reduce time first and then the number of errors.

7) Alleys 5 and 1 present more difficulty than the others. Introspective data revealed no reason for this.

8) From a purely qualitative and observational point of view, E believes that this technique may be of value in testing frustration tolerance.

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THE INTEGRATION OF FACTOR ANALYSIS WITH PSYCHOLOGY*

A Reply to Professor Godfrey Thomson's Review of The Description and Measurement of Personality†

RAYMOND B. CATTELL

University of Illinois

For one of Spearman's midshipmen (if thus I may briefly indicate my rôle) it would normally be flattering to be made the recipient of the sort of resounding broadside that Professor Thomson used to discharge at Spearman himself. It is disappointing to find, however, that he has discharged much unduly captious anti-personnel shot besides the formidable, penetrating stuff that should have tested the theories I have launched.

With his numerous criticisms of annoying trivia I have much sympathy, but would point out that the preparation of the manuscript during the war years made many of these short cuts inevitable. Others it would be impracticable to remedy even now. For example, my critic objects to my "abuse of the English language" by such "clumsy and ugly terminology" as 'frustration tolerance,' 'disposition rigidity' and 'need blamavoidance.' Actually these terms are due, respectively, to Rosenzweig, Walker and Murray. Am I expected to ignore such rude creations of the American and Australian pioneer fringe until they are expressed in more civilized form? If they are to be criticised there are more serious grounds than their ugliness; namely, that, at least in the case of 'frustration tolerance' and 'need blamescape,' they are terms invented without the necessary experimental, factorial proof that in fact any such single trait exists. It is precisely because of this experimental crudity that the verbal crudity is not only permissible but appropriate. Transient, tentative concepts are acceptable with any rough label. When, on the other hand, they become experimentally proven functional unities,

* Doctor Cattell's reply was written last fall and mailed to a member of the Editorial Board by whom it was remailed to the Publishers. Apparently the manuscript was lost in transit, and its loss was not discovered for months. This explains the delay in its publication. Ed.

† Godfrey Thomson, "Cattell's Study of Personality," *Jour ed psycho.*, 39:5 (May, 1947) pp. 273–282.

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operationally measurable and scientifically useful, they must be born again clothed in more apt and agreeable terms, guided by the fuller knowledge of their nature that has become available. Admittedly, in general, much would be saved by using non-committal alphabetical symbols instead of prematurely interpretive labels. A letter indicates that a man has discovered an entity or idea for which, with proper scientific caution, he has not yet formed an interpretive name. The converse, where a man finds a name without an idea, is unfortunately more common.

Professor Thomson also takes sharp exception to the absence from my book, or the original articles behind it, of additional tables (there are no fewer than twenty-eight in the book) showing "the raw correlations and the actual data." Surely there is a happy medium in this matter of publishing detail? A writer welcomes those extremely rare, thorough and critical readers—like Professor Thomson himself—who are prepared to check and analyze calculations, but these precious few can always obtain the material directly from the author. In my opinion it suffices if a factor analytic study publishes (1) the unrotated factor matrix, (2) the rotated matrix on the oblique reference vectors, (3) the transformation (rotation) matrix, and (4) the matrix indicating the angles among the oblique reference vectors. If the editor will then stand for one more table it should be (5) the original matrix of correlations, to permit a check on the accuracy of the factor extraction. Actually the majority of American journal editors begin charging the author from the first table—a curious custom since another author is charged nothing for using the compositors' time to say in pages of verbiage what could be neatly said in a single table. I have ascertained that the journals with which Professor Thomson is editorially connected make no such charges, which may account for his unawareness of the reasons for the restrictive tendencies he criticizes.

When Professor Thomson gets to the real substance of the book—very belatedly from the viewpoint of one eager to benefit by the comments of so potentially instructive a critic—he begins by objecting to the extraction of as many as twelve personality factors. This objection is based on nothing more substantial, however, than the fact that in his experience it has never been done before! The number of group or general factors to be expected in personality is certainly, on psychological grounds,

decidedly more than twelve: these are only the twelve of largest variance. Moreover, even on purely mathematical grounds, since the mathematical statisticians have not yet come to the aid of the psychologist to the extent of providing him with a formula for the probable error of a factor loading, the number of factors that can be reliably extracted for a given population sample and number of variables is anybody's guess. The present writer has found Ledyard Tucker's purely empirical criterion to check better with general and circumstantial evidence, in four or five widely different studies, than any other criterion offered—and in this study it indicated eleven or twelve factors.

In any case it is always definitely more satisfactory to extract initially too many factors rather than too few. For, in the first place, as Thurstone points out, the process of rotation for simple structure will generally eliminate superfluous, spurious factors, whereas any attempt to rotate on an unduly cautious, inexhaustive, factor extraction may yield very distorted factors or fail to arrive at simple structure at all. It is better to aim at the full factor extraction, even on 'small' populations, and accept the resulting factors as limited in accuracy of pattern by the smallness of the population, rather than to truncate the factor extraction prematurely. In the last resort the proof of the reality of the primary personality factors offered in my book must be the ability to reproduce them by independent researches. And the reply to Professor Thomson is now available in two such independent researches, in which the rotation was carried out quite 'blindly' as regards the meaning of the variables, but which clearly yielded at least ten of the twelve primary personality factors delineated in the original research.[1]

Nearly a half of Professor Thomson's review is devoted to my "confusion" and "lack of accuracy" on p. 559. The chief trouble with page 559 is that it is only one page. Because by far the greater part of my audience is interested primarily in personality study rather than mathematics I have everywhere condensed the mathematical presentation to a minimum—sometimes an absurd minimum perhaps—and the attempt to

[1] "Confirmation and Clarification of the Primary Personality Factors." *Psychometrika.* 1947, 12, 197–220.

"The Primary Personality Factors in Women, Compared with Those in Men." (In Press.)

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put the main theorems of factor analysis on one page (page 559) has led to generalizations that can be criticized by a mathematician—especially if he is out to split hairs. Actually my critic seems to impute to me confusions that are inherent in the terminology that has grown up—a somewhat inconsequential position since the growth of the technical procedures owes much to him and I have only come along later to apply them to psychology. However, if our debate succeeds in clearing up the ambiguities of certain terms and symbols it will be entirely justified.

The traps for the unwary psychologist concern principally the use of the terms factor, structure, angle between factors, and pattern. For Thurstone[1] a factor pattern is simply a section of a factor matrix, assigning factor loadings to variables, while a structure (or configuration) is the spatial picture of the correlated variables (test vectors) in the common factor space, when meaningful simple structure is reached. In short, a pattern is a set of specification equations for predicting a test from factors, whereas a structure is the spatial picture of all the relationships of factors and tests.

For Holzinger[2] on the other hand, a structure is a statement of the correlations of the tests with the factors and a pattern is the corresponding statement of the loadings of the tests with the factors which, in the case of oblique factors, are different. Thomson seems to use pattern and structure in the same sense as Holzinger. Now these confusions over the meaning of structure are exacerbated by the further ambiguity that arises over the term 'factor' when we come to deal with oblique factors, as illustrated below.

Let us suppose that simple structure has been attained in a two space problem, the 'hyperplanes' (in this case the intersections of a plane with the plane of the paper) being given to us by the lines A_1B_1 and A_2B_2 drawn through the thickest density of points, representing tests in the 'hyperplane.' Then OF_1 is the Reference Vector (R.V.) drawn normal to A_1B_1, and OF_2 is the corresponding R.V. for A_2 B_2. In the usual problem (in more than two dimensions, which cannot be represented by a diagram)

[1] *Multiple Factor Analyses*, Thurstone L. H. Chicago University Press. 1947.

[2] *Factor Analysis*, Holzinger, H. J. and Harman, H. H.

the lines A_1B_1, A_2B_2 are actually the intersections of hyperplanes and may be distinguished from the Reference Vectors, therefore, by calling them Intersection Vectors or I.V. Now the confusion arises from the fact that some psychologists may be inclined to stick to the Intersection Vectors OA_1 and OA_2 as the factors while others may find it more convenient to consider as factors the Reference Vectors OF_1 and OF_2. If OF_1 is factor 1, the corresponding I.V. 'factor' is OA_2.

The relative advantages of these two conventions for psychologists seems never to have been considered by Professor Thomson, who has followed the mathematical convention of calling oblique projections the projections on the Intersection Vectors, OA_1 and OA_2. In order to investigate the *pros* and *cons* for these practices we must first see what the relations are between the two systems. If OP is a test vector its 'correlation' with the R.V. OF_2 is OM and its 'loading' in OF_2 is ON. With I.V. OA_1 on the other hand, the 'correlation,' ON, is proportional to the 'loading' ON on the R.V., while the 'loading,' OM, is proportional to the correlation OM, on the corresponding reference vector. Similarly, for the corresponding reference and intersection vectors OF_1 and OA_2, an easy interchangeability exists.

The *pros* and *cons* seem to the writer as follows:

1) In the process of rotation one works with projections on the Reference Vector, calling it the 'factor.' It is more intelligible to most psychologists and students learning the procedure to adhere to this throughout, instead of adding the complication of a shift to Intersection Vectors at the end.

2) Tests in the hyperplane have some loadings (but not correlations) with the R.V.'s, so that the factor pattern does not show a row of zeros if we call R.V.'s factors and the specification equations are not so simple as if the I.V.'s were used. On the other hand, the structure (Holzinger) is simpler with the R.V.'s than the I.V.'s, since tests in the hyperplane have correlations with the Intersection Vectors. One has a choice, therefore, between simple factor estimation from tests, with complex estimation of tests from factors (using R.V.'s) or the converse, (using I.V.'s.) Some psychologists to whom I have put this question favor the former, some the latter.

3) The angle between the R.V.'s, is the complement of the

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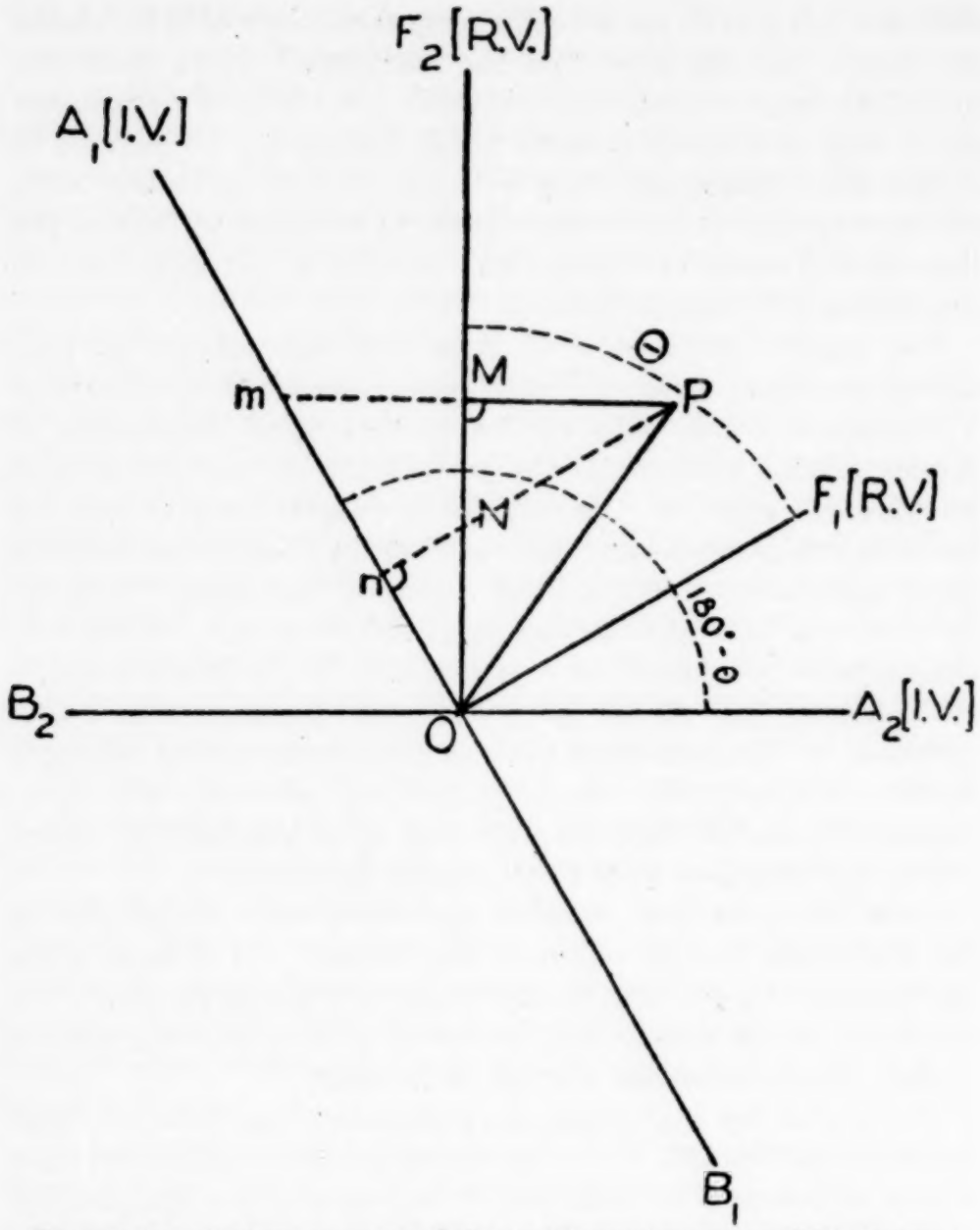

The relation of reference vector (R.V.) to intersection vector (I.V.) factors.

angle between the I.V.'s, as can be seen from the diagram. That is to say, if the former are positively correlated by an amount θ, the latter are negatively correlated by the same amount. The choice can be guided, therefore, by whether it makes better sense psychologically to say that the factors are positively or negatively correlated. In one of the very few examples available to us with complete insight—the box problem of Thurstone[1]—it is found that the factors corresponding to length, breadth and height are 'positively' correlated if we use the I.V.'s as factors and 'negatively' if the R.V.'s are used. Since we know that in this population the boxes retained a rough similarity of shape as they got larger, the factors should be positively correlated—a telling argument in favor of the greater applicability of the I.V.'s.

4) On the other hand, a considerable amount of additional computation (the calculation of the inverse of, for example, a 12×12 matrix is no light task) is necessary at the end of a research if the values (loading and correlation) on the R.V.'s have to be transformed to corresponding values on the I.V.'s. (The simplicity of the two dimensional transformation above must not deceive us).

My view is that (2)[2] and (3) above outweigh (1) and (4) and that the term factor, or at least 'corrected factor,' is best reserved for the I.V.'s. But in most initial investigation in a field, and in most pure research, we never proceed to use a specification equation and our sole purpose is the discovery of factors, for which it suffices if we find, or identify, a factor by the relative loading of certain tests in that factor, i.e., recognizing which tests are high in it and which low. This can be done just as readily from the structure (Holzinger) on the R.V.'s as from the pattern on the I.V.'s, the values of which are simply proportional. Consequently, it would seem best, in view of (4) above, to make all initial reports of researches discovering factors in terms of R.V.'s, which we may call the 'vice-factors', and this the present writer, for one, has always done in his published studies.

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[1] Thurstone, L. H. *Multiple Factor Analysis.* University Chicago Press. 1947.

[2] Because in most applied work a simple specification equation is undoubtedly more convenient than a simple factor estimation; for with tests designed directly to do the latter only the former task remains.

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The point is not, therefore, that I disagree with Professor Thomson in regard to the ultimately greater claim of the I.V.'s or corrected factors; but that I disagree with his never having raised the possibility that both reference and intersection vectors have a claim to be called factors. Further I argue that it would facilitate all exploratory research to adopt the labor-saving device of reporting in terms of what I have called vice-factors, i.e., reference vectors, upon which the rectangular projections or correlations of the variables are recorded.

The real weakness of Professor Thomson's review of my work, however, is that it is written for the author, who frankly finds his technical comments valuable and interesting, rather than for the general reader. Nearly a half of the criticism is devoted to one page of the book. I have the impression that the reviewer in Edinburgh sits too remote from the strong tides in the affairs of American psychologists to perceive what the greater part of the book is striving to perform. We are at a juncture where applied psychology, educational and clinical, is making tremendous demands upon pure psychology. In the year 1948 far more psychologists are in training than at any time in history and the numbers are particularly swollen by the large batallions of clinical psychologists sent by the Veterans Administration. Caught at the flood, this tide could do much to advance the scientific study of personality which it is demanding. Moreover, the success of these men in practice with applied problems will in turn depend a great deal on the scientific soundness of the methods they are taught. At the moment most of these students are content to deal with personality and the principles of personality study in vague and non-operational verbal generalities. Or, if they approach personality measurement, it is in terms of patent 'tests' and pseudo-metric 'trait' measurements which show they have no awareness of the necessity or the means for basing measurement on prior exploration of the structure of functionally unitary traits. My purpose was to wean the intelligent student from this sickly diet, by demonstrating the possibility of truly objective methods. Unfortunately, to fling the student into mathematical intricacies, without first amply demonstrating the problem in personality terms and showing the relevance of each mathematical device to a personality

problem is poor educational method—and here Dr. Thomson criticizes more like a professor of mathematics than of education. There is a very real education problem to-day of generating interest in statistical approaches and avoiding its destruction by too sharp recourse to rigorous technicalities. I doubt whether the spectacle of author and reviewer splitting hairs (or dare I say splitting vectors?) is calculated to attract the psychology student of embryonic mathematical interest to this essential approach.

If we are to be realistic and constructive at this critical juncture in the development of the pure and applied science of personality, we must begin by such admissions as that not one clinical psychologist in a hundred reads such excellent factor analytic treatises as those of Holzinger, Thurstone and Thomson. Factor analysis has still to be integrated into psychology—though the defect of integration is perhaps not as great in educational psychology and the study of abilities as it is in dynamic and general psychology. This integration will be achieved by permitting the student certain reasonable approximations in the method, so that he will be more able and willing to use it; by integrating verbal and mathematical concepts as I have attempted to do throughout; and by demonstrating that factor analysis, and factor analysis alone, is already able to cope with these intricate psychological problems, yielding objective solutions where none were previously possible.

This task of integration is an enormous one because of the great range of variables to be brought together and the prolonged statistical treatment required. If any tangible advance in personality measurement is to be made with our present resources of objective tests and statistical assistance we cannot spare time to dot all the i's and cross all the t's. Professor Thomson may feel it is "a duty to science to call attention" to a certain "hurry" and need of "greater care" in the reported studies. I must reply that even for the good of pure science an uncomfortable tempo has sometimes to be reached. If pure science is to benefit from the great resources of applied science it has to keep a date with the approaching flood tide of applied psychology, directing it to the most worth-while methods and objectives of investigation. I would reply further that even without this historical circumstance an intelligent approximation—an adaptation of the

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degree of accuracy to the stage of the problem—is the aim of scientific procedure. That some approach to this optimum coördination of exactness of use in the various tools employed has been sufficiently obtained is shown by the agreement of the results from the various contributory studies on personality factors, as well as by our capacity to obtain structure and meaning where previously there was a void.

A PREDICTION OF LAW SCHOOL ACHIEVEMENT FROM HIGH-SCHOOL RANK, READING TEST SCORES, PSYCHOLOGICAL TEST SCORES, AND AVERAGE GRADE IN PRE-LAW COURSES

VIRGINIA HAVENS

The University of Texas

An investigation was recently conducted at The University of Texas to determine the value of various variables which were known or which could be readily measured, in the prediction of scholastic achievement in the first year's work in the School of Law at that University. The variables studied in this investigation were: (1) quarter rank in high school, (2) scores made on the American Council on Education psychological examination, (3) scores made on the American Council on Education Coöperative English test, Test C2; Reading Comprehension (Higher Level) Form T, (4) grades made at The University of Texas in freshman and sophomore courses in English (twelve semester hours), Government (six semester hours), Economics (six semester hours), History (six semester hours), Philosophy (three semester hours), and Psychology (three semester hours). These pre-law subjects were selected because they were required of all pre-law students at The University of Texas or because they were taken by most pre-law students. Results of each of these courses or tests were correlated with grades made by the first-year law students in Contracts (five semester hours), Torts (six semester hours), Legal Bibliography (one semester hour), Personal Property (three semester hours), Agency (two or three semester hours), Procedure (four semester hours), Real Property (three semester hours), and Constitutional Law (four semester hours).

This investigation was based on the obvious need for a reliable method of predicting scholastic achievement, particularly in the field of professional training. The increase in the scholastic population of our colleges and universities, especially in the years following the war, has been remarkable. As the enrollment in universities and colleges increases, greater care should be exercised in selecting for admittance the persons most likely to succeed in such professional schools. In this manner, the time of the faculty

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members and of the students would be conserved and the facilities of the University would be used to the best advantage.

Among previous prediction studies surveyed were the following: prediction of scholastic achievement in general, by Williamson;[1] prediction of scholastic achievement in Business Administration at the University of Chicago, made by Kornhauser,[2] prediction of the achievement of men in Business Administration courses at The University of Texas, by Martin;[3] a study made by Krieger[4] in the prediction of success in professional courses for teachers; a summary by Sargent[5] of the findings of Orleans[6] with reference to the variables which should be used in predicting teaching success; a prediction of achievement in engineering courses, made by Thurstone;[7] several prediction studies in scientific fields, including those of Moss[8] and Douglass[9] for medical students, and of Rhinehart[10] for nurses. In direct relation to this paper, study was made of several investigations on predicting achievement in schools of Law. These included those of Douglass, Luker and Lovegreen,[11] Husband,[12] Luker and Douglass,[13] Harrell,[14] Walker and Harrell,[15] and Adams.[16]

Dr. Royal B. Embree, Jr., of The University of Texas, as a part of another comprehensive study, administered the American Council on Education Coöperative English Test, Test C2: Reading Comprehension (Higher Level) Form T test to one hundred eighteen students in the freshman law class of The University of Texas in the spring of 1947, and he supplied the writer with these data. The complete scores on this test are made up of a score on vocabulary, a score on speed, a score on comprehension, and a score on the test as a whole. In addition to these results, the subjects' scholastic records, as shown in the records in the Registrar's Office at The University of Texas, were examined, and a data sheet was completed on each subject.

The product moment coefficient of correlation method was employed to determine the relationships between the various parts of the reading test and achievement in the freshman law courses.

The prognostic value of the different parts of the reading test was determined by means of the regression equation and the standard error of estimate.

The regression equation, standard error of estimate, and the multiple correlation, based on combinations of the results of the

different parts of the reading test, were used as a means of determining the extent to which achievement in the first year of law school could be predicted from these factors.

The results of this study indicate that there was a positive relationship existing between the parts of the reading test and the freshman law grade average ranging from .31 between vocabulary and average freshman law grade average to .44 in the case of freshman law grade average and speed.

The correlations obtained between the different parts of the reading test were .73 between vocabulary and comprehension; .74 between vocabulary and speed; and .80 between speed and comprehension. This would indicate that the reading test is consistent throughout.

The results of this study indicate that the freshman law grade average could be predicted, with a standard error of estimate of ± 8.1 from the multiple regression equation

$$X_1 = 49.41 + (-.094\ X_2) + .266\ X_3 + .144\ X_4$$

X_2 is based on vocabulary scores, X_3 based on speed, and X_4 based on comprehension.

The coefficient of multiple correlation between the three parts of the reading test and the average grade in freshman law courses was found to be .45, which is to say that the Law School grade average could be predicted to that extent. This also indicates that twenty-one per cent of the variance in freshman law grade average is accounted for by the abilities measured by the different parts of the reading test. The fact that this correlation is small may mean that the measurement situation is contaminated by many things uncontrolled or not held constant.

The value of quarter rank in high school classes in predicting success in college or achievement in Law School was shown in this study; however, the number of cases in which such data were present were so small that no correlations could be computed. Those data in this study bear out the findings in other studies. Before high school quarter ranks can be used to predict success in college or Law School, however, some correction must be made for variations in methods of grading in high schools, size of high schools, etc.

Unless such studies are confined to a single high school system, it is doubtful if they will ever be of value in predicting success in

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college or in special branches of college. There are too many factors which cannot be controlled which influence high-school grades to various extents in the different high schools.

It is likely, however, if a sufficient number of cases were included, that there might develop a relationship that could be demonstrated between quarter rank in high school and success in college or achievement in specialized schools within the college.

This study, with only twenty-eight cases, showed a significant difference of 3.30 between grades made in pre-law courses by students ranking in the highest quarter of their high-school classes and those students ranking in the first, second, and third quarters of their high-school classes. This was the only significant difference obtained.

It was found that there was not sufficient data on the American Council on Education psychological examination to be used. It is highly probable that a relationship does exist between scores made on this examination and average grade made in freshman law courses, which might be made the basis for another study.

The following conclusions were drawn from the findings of this study: (1) There was a positive relationship existing between freshman law grade average and the different parts of the reading test; namely, .31 between vocabulary and freshman law grade average; .41 between comprehension and freshman law grade average; .44 between speed and freshman law grade average. (2) Speed was the best index of the three measures as a basis for predicting achievement in the average freshman law grades. (3) Achievement in the freshman law courses could be predicted by means of a regression equation with a standard error of ± 8.1. High school quarter rank is not of sufficient value to predict successfully achievement in freshman law courses. (5) Pre-law grade average can be used to advantage in predicting achievement in freshman law courses.

Scholastic achievement in freshman law courses could be more accurately predicted by using a combination of pre-law grade average and the reading test as a whole. In addition, it is suggested that one or more freshman law courses be shifted to the academic school and that all students be required to pass this course or these courses as a prerequisite for admission to the Law school.

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BOOK REVIEWS

ROSE H. ALSCHULER AND LA BERTA WEISS HATTWICK. *Painting and Personality.* 2 vols. Chicago: University of Chicago Press, 1947, pp. 590.

Studies of children's art have been largely oriented toward problems of clinical diagnosis. This is true of the work of Viktor Lowenfeld, Edward Liss and Margaret Naumberg; and it is even true of the work of Trude Schmidl-Waehner although she has in recent years made some important studies of normal groups. As in any other approach to the study of personality, many important hypotheses and insights can emerge from the study of clinical or problem cases; but it is not justifiable to assume that we can learn all that we need to know about normal groups in this way. The primary contribution of *Painting and Personality* consists in the fact that the findings are based on a run-of-the-mill sample of one hundred fifty nursery-school children. The paintings produced by these children were collected daily, and were compared with seriatim records of the children's behavior in school and at home.

The two beautiful volumes in which this interesting material is reported provide a landmark in presentation, in the field of child development. The silk screen reproductions of the children's paintings are supplemented by numerous photographs of children at work. Case summaries are included, together with an exceptionally full statistical documentation. As a description of an approach to the study of child personality the book will undoubtedly take a place along with the studies of such early pioneers as Isaacs, Piaget and Griffiths.

The basic generalization documented by this study is this: "the approach through individual case studies not only has given further insights into the highly individual quality of each child's work, but has revealed that there is a very general, and perhaps even universal, tendency for all sorts of individuals to express similar feelings, reactions and problems in like or at least comparable fashion. This likeness is evidenced in choice of color and sometimes in similarity of form, line and/or space usage" (p. 4). In order to arrive at a more precise definition of these similarities and differences of expression, and their probable meanings, an

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attempt was made to analyze and relate the painting tendencies of children and their behavior in other situations.

The findings led to the following conclusions:

a) color tends to give the most intelligible clues to the nature and degree of intensity of the child's emotional life.

b) line and form tend to give the most intelligible clues to energy output and to the degree and direction of control.

Color, line and form together may serve to indicate the balance which exists between the child's impulsive drives on the one hand and his overt controlled behavior on the other.

c) space usage and spatial pattern tend to give less a picture of the child's inner life than of the child in his relationship to the environment.

The relation between color emphasis and strong emotional response is supported by such findings as these: a primary interest in color is dominant at the stage when children are operating largely at an impulsive level; the use of color tends to be more intense and persistent among girls; children who emphasize line and form more than color tend to be more self-controlled and more reasoned in their behavior, and to be concerned with external stimuli; during periods of special emotional involvement, children tend to revert to color-mass painting; children who have been markedly repressed or restrained tend to use color more freely as they become more generally freed from restrictive discipline.

Even stronger evidence of the relation between color and emotional sensitivity comes from the study of the use of specific colors: some children consistently choose warm colors like red, yellow and orange, while others prefer cooler colors such as blue, black, green and brown. The former appear to be freer in emotional behavior, warmer, more affectionate and also more self-centered. Their nursery-school behavior is described as 'sympathetic,' 'dependent on others for affection,' 'coöperative in play.' Children who consistently favor cold colors are often highly controlled or overadaptive, with paintings which may give little clue to their inner drives.

On the whole, the findings here agree with the hypotheses presented by other students of art. But there are some differences in emphasis, probably due in part to differences in the age

of the subjects in this study and in their adjustment. For instance, Waehner reports that a use of green, blue and black goes with depression or anxiety; this fits with results in Anastasi and Foley's summary according to which dark and cold colors are not used by manic patients. In Alschuler and Hattwick's study of preschool children, use of the cold colors goes with adaptation and control, sometimes over-control, as judged by the nursery-school teachers who recorded the children's behavior. Green is emphasized by children who are orderly and careful, blue by those who do not express their feelings openly, and who show controlled reactions, sometimes in the direction of self-restraint or repression and sometimes outwardly directed, adaptive behavior. Such differences in emphasis indicate a need for further study and clearer definition of such terms as control; it is not clear in this study that the control described involves anxiety and depression. Are we dealing with the beginning of a process which may look relatively constructive but which may prove destructive to the personality over a long period of time? If so, the discrepancy between Waehner and the authors of *Painting and Personality* would tend to disappear. Or do we merely need to define more exactly the degrees of control and the emotional price which is paid for it?

Age differences are undoubtedly important. We do not as yet have any adequate studies of personality in relation to painting at successive ages from preschool to adolescence. The use of red may, for instance, accompany normal emotional spontaneity at three and four, when children are still open and impulsive, but may become an indication of immature explosive behavior at a later age when children in our culture have generally internalized more control. There may be sub-culture differences at any level; behavior which is regarded as well-adapted in one group might be considered inhibited in another. It is quite possible that colors may have different meanings for different groups, depending on differences in early experience associated with the colors.

Another example of differences in evaluation appears in the discussion of symmetry. Rigid symmetry, according to Waehner, is conspicuously preferred by depressive neurotics; but Alschuler and Hattwick emphasize the relation between symmetry and adaptiveness. Here again we may be dealing with a difference

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in degree or in the meaning of behavior at different levels of development, and differing interpretations of adaptiveness. It is clear that we need to know more about the relation of symmetrical and orderly structure to adaptation; at what point do these involve such a degree of control as to limit creativeness or to involve undue repression?

Neither in this nor in any other study known to us is the analysis of art in relation to personality presented in a context of explicitly stated assumptions regarding personality adjustment, or of assumptions concerning the relation of emotional and motor responses to different patterns of adjustment. Words like 'adaptive' and 'rigid' are often weasel words when used in the discussion of normal individuals. We do not know how much control or how much rigidity, or how much adaptability is desirable from any one of several points of view. Is the amount of control which contributes to a well-functioning nursery-school group the same as the amount of control that permits the child to grow at his own pace, with a development of his own ideas and an integration of feeling and thinking which will make for good mental health and good human relations? What relation can be postulated between the amount of control needed for smooth adaptation to conventional social requirements, and the amount of control that makes for good creative work?

Such questions as these are pertinent in relation to this study because we are not given a discussion of the implications of a term like control. Until we have clearer definitions, there will continue to be differences in the findings of different investigators even when they deal with comparable samples.

All workers find that in the area of color, the preferential use of red tends to go with emotional responsiveness, while an emphasis on blue or black goes with a somewhat greater degree of inhibition; in the area of form, painting in large masses goes with emotional freedom, while the emphasis on line goes with 'control'; preference for verticals goes with assertive behavior, while the emphasis on curves goes with feminine or compliant behavior; in the matter of space, restriction to a small area goes with timidity, while use of the whole space goes with spontaneity and freedom. But Alschuler and Hattwick are very careful to state that such generalizations are oversimplified, that one cannot diagnose a child's personality in terms of one to one relation-

ships, and that a dependable statement about a child can result only from a careful consideration of all the trends and variations in the picture of a given child. Nevertheless, the generalizations are fairly well supported by the quantitative evidence in Volume II.

In view of the richness of their material, the authors might have made a bolder attempt at theoretical formulation. This is not a deficiency peculiar to them; pioneer workers are often reluctant to venture hypotheses that may prove wide of the mark. Hypotheses are needed to cover the relationship between movements in painting, and gestures and other movements in other situations. It is a tempting assumption that whether it is a preacher pounding his chancel, a chairman pounding his gavel, or a carpenter bringing down his hammer, a vertical movement is an assertive movement, not a movement of compliance. Similarly, the constricted movements of the timid child which keep him in one safe spot in the nursery playground may be in no way different from the constricted, risk-nothing motions which result in small tight marks on the paper which he paints. The fact that movement is recorded in paint should not confuse us—the essential matter is the relation of the movement to the feeling from which it arises. At older age-levels this relation is less direct and immediate, since more elaborate planning and experimentation lie back of a specific painting and the relation between feeling and recorded movement is more subtle and complex.

Hypotheses about color may be relatively difficult to formulate. The association of light, fire and warmth with the color red may, of course, be one of the factors involved in the differential use of red. Apart from this, red may have a greater attention-getting value and for this reason may be either sought or rejected by an individual child. These are matters for further research. It is to be hoped that studies of art in different groups will provide material for the verification of hypotheses and, therefore, for theoretical understanding; this in turn should illuminate the differences in results obtained by different investigators and provide a sounder basis for work with individuals.

LOIS B. MURPHY
and
HAROLD E. JONES

Sarah Lawrence College
University of California

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LESTER E. HEWITT AND RICHARD L. JENKINS. *Fundamental Patterns of Maladjustment. The Dynamics of Their Origin.* Springfield, Illinois: State of Illinois, 1946, pp. 110.

Children who differ from each other in expressing fundamentally different patterns of behavior maladjustment have experienced fundamentally different patterns of environmental circumstances. Conversely, children that are exposed to such fundamentally different patterns of situations will exhibit fundamentally different patterns of maladjustment. These are the underlying assumptions made by the two investigators reporting the present study on patterns of maladjustment. The particular investigation they make is based on the statistical analysis of five hundred case records of children examined at the Michigan Child Guidance Institute. The three fundamental patterns of maladjustment investigated by them are: the unsocialized aggressive behavior syndromes, the socialized delinquency syndrome pattern, and over-inhibited behavior syndrome. The meaning of these in terms of behavior traits found in the records of the cases studied were all determined empirically; selected on the basis of statistically demonstrable relationship to each other. This volume includes a brief description of the literature dealing with relationship between specific behavior patterns of behavior and patterns of situations, a statistical analysis with the use of tetrachoric correlation coefficients for revealing the relationships, and a chapter by Dr. Jenkins on the psychiatric interpretation and treatment of the three fundamental patterns considered.

There is no table of contents in this volume and the whole arrangement and presentation is far from being either intelligible, clear or orderly. Appendix A runs from page 92 to 106 and includes many tables whose relevance and significance are not easy to follow. Appendix B includes a Master's dissertation on the overinhibited and unsocialized aggressive child. There is no index. In spite of these defects of the publication, there is a good deal of material in the volume presented by the investigators which should be of value to one group of people interested in the problems; namely, those who are both statistically and clinically oriented. Clinicians will find Dr. Jenkins' chapter suggesting differential therapy for the overinhibited versus the underinhibited maladjusted of interest. And clinical students who are

searching for ways of applying statistical methods in the study of behavior problems will find some suggestions for research here.

H. MELTZER

Psychological Service Center
St. Louis, Missouri

MAURICE J. SHORE. *Soviet Education.* New York: Philosophical Library, 1947, pp. 346. $4.75.

Dr. Shore's book is on a subject of very great present interest to us, but it does not contain much of what we most want to know. What Marx and Engels once said about the nature and function of education in a communist society, what Lenin later said, and what a great many Soviet leaders and thinkers have more recently been saying occupy space that one wishes had been devoted to accounts of current practices and plans. The evolution of educational theory among the Bolshevists does not seem so important at the moment as do their positive school objectives, their developing programs, their provision of facilities and their modes of operating.

We can pretty well take for granted that education among the Russians is being used to advance and perfect the Communist state, that it is realistically emphasizing polytechnical training, that it is designed to cultivate intense hatred of whatever and whomever the Party leaders call bourgeois. Shore likes especially to dwell on these and closely related matters. He fails to satisfy our curiosity about the marked shifts in Soviet educational policies in the last dozen years. Why has so much of traditional bourgeois school practice been reinstituted; for example, fees, examinations, teacher authoritarianism, segregation of sexes, uniform textbooks, formal ethical instruction? Not much enlightenment on such things is afforded by the book. Why was what Americans call progressivism in education given up for the older and more conservative ways of doing things? What are the Russians actually up to in their schools today and how are they proceeding? Probably Shore does not know, but we wish he did and had told us here.

Thanks are due the author for his short but illuminating account of the Russian repudiation of pedology awhile back. Pedology to Americans means child study or the science of child

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development and it has been hard for us to see why the Russians would throw that out. Apparently what is banned by the Soviet authorities is that whole body of psychological inquiry, testing and classification that suggests biological determinism. This smacks too much of the persistent bourgeois conspiracy to fix things so that the lower orders will stay low. Communist leaders and theorists want no hint of limits to the improvability of a man through social and environmental arrangements.

All in all the book is not very well organized and it is not easy to get from it the good it does have to offer. It deals best with things that probably at this time matter least. It does not make clear the exact nature of the challenges presented to us in education by our great and distrusting world neighbor.

MATTHEW H. WILLING

University of Wisconsin

EDWARD W. DOLCH. *Problems in Reading.* Champaign, Ill.: The Garrard Press, 1934, pp. 373.

It is seldom possible to present adequately in a textbook of reading all the important problems. "This book presents intensive discussions of a large number of important aspects of the teaching of reading." Much of the material has appeared previously as journal articles or was presented at educational meetings. Topics covered include word recognition and phonics, vocabulary, remedial reading, testing reading, reading difficulty, and literature. Four chapters, dealing with education and spelling problems, are not concerned with reading.

Some of the desirable points of emphasis in the book include the following: (1) the relation between mental maturity and phonetic skill; (2) repeated association of word form and word sound; (3) letter phonics and syllabication in word recognition; (4) the basic sight vocabulary; (5) poor readers are made; (6) no school system need wait for special help to start remedial reading work; (7) increasing children's meaning vocabulary; (8) need of remedial reading counsellors; (9) graded reading difficulty; (10) guiding reading; and (11) reading pictures.

The reviewer has reservations about some of the material in the book: (1) Many will not agree that "remedial reading furnishes at present the best opportunity for general improvement

of work in our schools." (2) The view that present reading tests are not useful to a teacher of a single grade because they cover a wide range of grades is not sound. Any grade above the first contains children with reading ability ranging over several grades. (3) Low intelligence is not considered a chief cause of reading disability, as stated by the author. (4) On page 226 the term 'reliable' is used wrongly. (5) The assumption that the smaller type employed in the higher grades is harder to read than the large type in the lower grades is contrary to experimental evidence. (6) There is no experimental evidence that children's eye-movements are slower (page 276) than those of adults. Perhaps the author had in mind pause duration. (7) The chapters on educational problems and spelling have no place in a book on reading.

The teacher of reading will find in this book much that is helpful. The book might well be used as a supplement to a systematic text on reading.

MILES A. TINKER
University of Minnesota

EUGENE HARTLEY. *Problems in Prejudice.* Morningside Heights, N. Y.: King's Crown Press, 1946, pp. 124.

In a succinctly written Foreword, Gardner Murphy credits this study with two achievements: (1) showing in quantitative form the degree of generality of the functions involved in the determination of prejudice and (2) that in prejudice we are dealing with a true generality of pathological response, not with responses based rationally on experience. The second conclusion is based on the fact revealed in this study that the prejudice to three fictitious groups—Danireans, Pireneans, and Wallonians—is as high as real groups.

This study was started in 1938, due to be published in 1940, but published later because the author was in war service. The source material for quantitative treatment was obtained by the use of questionnaires given to groups of college students. Eight colleges were used for this purpose and these included groups with the minority group in them. Samples were secured from several liberal arts colleges, educational majors in another college, two teacher-training institutions, one collegiate school of business. The colleges selected represented different philosophies

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of education, some like Bennington represent the Progressive attitude, others more traditional, others included discriminated against minorities as well as members of the dominant culture group. In addition to the fact that there is a hierarchy of preferences in the American scene; also revealed in this study is the fact that members of minority groups who rank relatively low in the hierarchy tend to incorporate the prevailing pattern as a whole into their value system with the unique exception of their own group. Their own group is placed on top of the list. Both of these conclusions are also revealed in earlier studies not mentioned or included in the references.

Illustrative of the clinical and biographical data prepared by Ruth Hartley are the following characteristics of the intolerant personality: unwillingness to accept responsibility; acceptance of conventional mores; a rejection of serious groups; rejection of political interests, and desire for groups formed for purely social purposes and absorption with pleasure activities; a conscious conflict between play and work; emotionality rather than rationality; extreme egocentricism; interest in physical activity, the body, health; likely to dislike agitators, radicals, pessimists; relatively uncreative, apparently unable to deal with anxieties except by fleeing from them; often his physical activity has in it a compulsive component. Generally, the framework of the study, as well as the manner in which it is carried out, shows fairly careful consideration and familiarity with quantitative methods as well as clinical methods for study of problems of prejudice. William Stern's concept of salience in personality is here for the first time applied in the study of race attitude. The implication is, as expressed by Hartley, that one may have little prejudice but nearly always act on it; whereas, another person can be quantitatively more prejudiced—ten times as much—but have his life so organized that more characteristically he responds with restraint. Salience and sheer quantity, that is, have different dimensions worth studying, separately as well as in related manner. The study includes a list of sixteen references, not at all exhaustive, with many references relevant for some of the problems considered omitted. The adequacy of the sampling of the population used might be questioned. However, the limitation of this sampling is recognized by the author. But in spite of these limitations, and the fact that war service delayed

the publication of the volume, it does represent a contribution that can be of value to students of a very important social problem—race relations and prejudice.

H. MELTZER
Psychological Service Center
St. Louis, Missouri

JAMES L. MURSELL. *Psychological Testing.* New York: Longmans, Green and Co., 1947. pp. 449.

The expression 'psychological testing' has so many meanings that the reviewer was interested in the way Mursell delimits the field. Essentially the book is built around intelligence testing to which four chapters are given. Since intelligence tests are considered almost synonymous with mental tests, the most elaborate consideration is given them. There is sense in this for the basic unsolved problems of psychological measurement are reflected most clearly in this advanced area of investigation. The chapter on aptitude testing and the one on personality, interest, attitude, and character testing perform chiefly the function of introducing the reader briefly to methods of construction, derivation of norms, and validation techniques within the framework of selected specific tests. Two introductory chapters are devoted to fundamentals such as definitions and the underlying assumptions of such concepts as validity, reliability, objectivity, and standardization. The final three chapters seek to evaluate the progress made to date, and to chart the directions in which the testing movement seems to be going.

The book also includes suggested additional readings and questions for discussion at the end of each chapter and two bibliographies, one of books and articles, the other of tests with pertinent facts about each.

Projective methods and the techniques of factor analysis are recognized as two of the most significant recent developments in the field, but are treated briefly and provide broad orientation only. The reader looking for the best thought in these areas will not find them here. Throughout Mursell's book, it is assumed that the reader has a knowledge of elementary statistics.

The author is convinced that tests are 'practical' instruments and that this emphasis "has from the first kept the testing movement in the path of sanity and realism." This attitude permeates

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the book. It is a point of view which seeks to separate the real gains from the extravagant claims that have been made for tests and to counter the contentions that no intelligible theory underlies the practices of workers in psychological measurement. Extended practical use is considered as evidence of ultimate validity. Mursell rests his case on the considerable historical evidence that tests have helped man meet some of his problems more effectively. To the extremists, be they evangelists or cynics, he asserts that our tests are as good as our psychological knowledge makes possible.

One 'practical' testing problem Mursell overlooked is faced whenever an attempt is made to interpret test results to the persons who take the tests. This is a very practical issue both for clinicians and for educational and vocational advisors, and there is some literature. Certainly one of the assumptions of psychometricians is that they are creating tools which can become effective instruments for the solution of human problems. The psychological meaning of a score is much more subtle than an appreciation of its statistical function in a group of scores.

There is a special value for beginners in this book because Mursell continuously points up the limitations of the knowledge with which he is dealing. This practice may help create the kind of critical thinking about psychological testing issues which is more important than mere familiarity with what has been done. Any reader who is familiar with Mursell's works has an expectancy for lucid writing and level-headed thinking. He will be rewarded by an uncommonly sane approach to the field of mental testing. The book should prove a useful text for introductory courses, for it is balanced, critical, and well-written.

PAUL E. EISERER

The University of Chicago

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